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**To:** [Robert W. Gensemer](#)  
**Cc:** [Joe Goulet/R10/USEPA/US@EPA](#); [Burt Shephard/R10/USEPA/US@EPA](#); [Robert.Neely@noaa.gov](#); [Eric Blischke/R10/USEPA/US@EPA](#); [PETERSON.Jennifer@deq.state.or.us](#); [John Malek](#); [Bob Dexter](#); [Chip Humphrey/R10/USEPA/US@EPA](#)  
**Subject:** Re: Number of growth-based low level hits in the round 2 report  
**Date:** 06/06/2008 03:04 PM  
**Attachments:** [PH\\_TOX\\_CLASS\\_FREQ\\_080606.doc](#)

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Attached is a summary of the round 2 tox results. According to my analysis, 43 and 11 samples were significantly different from control and between 80 and 90% of control (Level 1) for *Hyalella* and *Chironomus* growth respectively. There were a few samples within the Level 1 range of difference from control that were not significantly different but most were significantly different. This indicates that the test can clearly discriminate differences at that level. Level 1 toxicity provides useful, valid risk assessment information and is important for evaluating spatial gradients. Whether it is critical for decision-making after the risk assessment is a risk management decision.

Jay

Note: I am fairly certain that these results are consistent with LWG summaries but did not do a detailed check with Lorraine Read's spreadsheets. I would be glad to discuss this further when I am back from leave on Monday.

Robert W. Gensemer wrote:

P.S. Upon reading LWG's methods text more carefully, the analysis below may not be correct. As in the text screenshot appended below (page 21 of Appendix G), I think their "minor (L2)" effects have to EXCEED 80% and be significantly different from controls, so this would not be the 10-20% effects range we are seeking. Jay did mention he was sure significant effects on growth were observed for one or both species in the 10-20% effects range, so perhaps he can help guide us as to how to track these data down?

-Bob

The biological effects levels are based on statistically significant differences from the negative control (based on a one-tailed, parametric or non-parametric *t*-test, with  $\alpha = 0.05$ ) in addition to minimum difference thresholds (Table 3-3). The decision to use the negative control in the comparison was made in cooperation with EPA and its partners because of the greater reliability<sup>8</sup> observed using this approach in Washington and Oregon, the fact that standardized freshwater reference sites are not yet available in the region, and because the results are more conservative (Ecology 2002). At either of these effects levels, a toxicity test endpoint response is considered a hit if the difference in response is greater than the defined threshold and is statistically different from control; a no-hit station has a difference less than the threshold or is not statistically different from control. If the observed difference exceeds the threshold but is not statistically significant, the test must have had a minimum detectable difference (MDD) equal to or less than the threshold. Indeterminate stations were defined as those that had actual differences that exceeded the threshold, non-significant statistical results, and an MDD greater than the threshold. MDDs were determined for each sample comparison using *post hoc* power analysis with 80% power, one-tailed  $\alpha = 0.05$ , and the sample variances. This process ensured that large-magnitude differences were not designated as no-hits based on lack of statistical significance because of low power.

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**From:** Robert W. Gensemer

**Sent:** Wednesday, June 04, 2008 9:54 AM

**To:** 'Jay Field'; [Goulet.Joe@epamail.epa.gov](mailto:Goulet.Joe@epamail.epa.gov)

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**Subject:** Number of growth-based low level hits in the round 2 report

**Importance:** High

Folks: In response to the discussion on TCT this morning, I looked at the round 2 report for evidence of significant growth effects (both species) in the 10-20% effect range. LWG defined their "no effects (L1)" data as anything less than 90% control performance, and their "minor (L2)" effects as anything within 80% of control performance AND significantly different from controls. I interpret L2 as representing toxicity test results as being effects significantly less than controls and between 80-90% of control performance. IF this is a correct interpretation, here are the total numbers of samples in this "bin" from the round 2 report (Table 3-30 of Appendix G):

Chironomus growth = 24 (10% of 223 total)

Hyaella growth = 98 (42% of 233 total)

Here is the whole table (if it comes through in the e-mail)

Table 3-30. Effects Level Designation of Sediment Samples Based on the Two Toxicity Tests

Toxicity Test Endpoint	Effect Level			
	No Effect	Not Reportable*	Minor Effect (Level 2)	Moderate Effect (Level 3)
<i>Chironomus</i> , mortality	174	0	34	25
<i>Chironomus</i> , growth	186	6	24	17
<i>Hyaella</i> , mortality	195	0	20	18
<i>Hyaella</i> , growth	85	4	98	46

\* At four locations, all organisms (both *Chironomus* and *Hyaella*) died; and at two locations, all *Chironomus* died. Hence, no growth effects were reported at these locations.

If I am interpreting this correctly, this would mean that 10 - 42% of the test results from Round 2 that our scheme would call a "minor effect" would become a "no effect" in LWG's proposed scheme. Please have a look and let me know if I'm missing something.

-Bob

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